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Veröffentlichungsversion / Published Version
Zeitschriftenartikel / journal article

REVISTA ONLINE DE PESQUISA

CUIDADO É FUNDAMENTAL

Universidade Federal do Estado do Rio de Janeiro • Escola de Enfermagem Alfredo Pinto

RESEARCH

DOI: 10.9789/2175-5361.2017.v9i3.688-695

Dieta enteral prescrita *versus* dieta infundida

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How to quote this article:
Simões SAR; Kutz NA; Barbosa MC; et al. Prescribed enteral diet *versus* infused diet. Rev Fund Care Online. 2017 jul/sep; 9(3):688-695. DOI: http://dx.doi.org/10.9789/2175-5361.2017.v9i3.688-695

ABSTRACT

Objective: To evaluate the prescribed volume of enteral feeding versus the volume infused, identifying the diet for interruption, and expenses generated by these interruptions. **Methods:** Observational study with adults and elderly patients receiving enteral nutrition in a private hospital in São Paulo. Data collection was performed by means of electronic medical records. **Results:** The infused volume was significantly lower than the amount prescribed in the five days of monitoring in the entire sample. The main complication in the experimental diet was diarrhea. Spending on non-diet administration amount to 41.4% of the amount spent for this service. **Conclusion:** This study contributes to the performance and nutritionist performance in conjunction with the multidisciplinary team in Nutrition Therapy aiming at the improvement of the patient.

Descriptors: Nutrition Therapy; Clinical Protocols; Enteral Nutrition.

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RESUMO

Objetivo: Avaliar o volume prescrito de dieta enteral versus o volume infundido, identificando as causas de interrupção da dieta e os gastos gerados por essas interrupções. **Métodos:** Estudo observacional, com pacientes adultos e idosos, recebendo nutrição enteral em um hospital particular de São Paulo. A coleta de dados foi realizada por meio de prontuário eletrônico. **Resultados:** O volume infundido foi significantemente menor que o volume prescrito, nos cinco dias de acompanhamento, em toda a amostra. A principal intercorrência na administração da dieta foi a diarreia. Os gastos com a não administração da dieta somam 41,4% do valor despendido para esse serviço. **Conclusão:** Este estudo contribui para a atuação e desempenho do nutricionista em conjunto com a Equipe Multidisciplinar em Terapia Nutricional visando a melhora do paciente.

Descritores: Terapia nutricional, Protocolos Clínicos, Nutrição Enteral.

RESUMEN

Objetivo: Evaluar el volumen prescrito de la alimentación enteral en comparación con el volumen infundido, la identificación de la dieta para la interrupción y gastos generados por estas interrupciones. **Métodos:** Estudio observacional con pacientes adultos y ancianos que reciben nutrición enteral en un hospital privado de Sao Paulo. La recolección de datos se realizó por medio de registros médicos electrónicos. **Resultados:** El volumen infundido fue significativamente menor que la cantidad prescrita en los cinco días de monitoreo en toda la muestra. La complicación principal de la dieta experimental fue la diarrea. El gasto en cantidad de administración no dietética al 41,4% de la cantidad gastada por este servicio. **Conclusión:** Este estudio contribuye al rendimiento y desempeño en nutrición en conjunto con el equipo multidisciplinario en el tratamiento nutricional destinado a la mejora del paciente.

Descriptores: Terapia Nutricional, Protocolos Clínicos, Nutrición Enteral.

INTRODUCTION

The probe-supplied diet is designed to provide all the nutrients normally ingested by the mouth and are essential for recovery and maintenance of health. Enteral Nutrition (EN) is the use of food for special purposes, with controlled intake of nutrients, in an isolated or combined form, of a defined composition, specially formulated and prepared for use by mouth or by hand, industrialized or not, used exclusively or partially to replace or complement the oral feeding of undernourished subjects or not, according to their nutritional needs, in a hospital, outpatient or home regime, aiming at the maintenance of tissues, organs or systems.[1]

The main global guidelines are that the first option for the nutritional supply route should be the digestive tract. The benefits of Enteral Nutritional Therapy (ENT) range from maintenance of nutritional status to reduction of hospitalization time to reduction of morbidity and mortality. The benefits of enteral dietary intake will be observed if dietary intake is given for 5 to 7 days in those patients receiving at least 65% of estimated caloric requirements.[2] The choice of enteral access depends on factors such as: the expected duration of therapy, the degree of risk of probe displacement or risk of aspiration, gastrointestinal tract conditions and anatomical changes.[3]

Malnutrition may be present or settled in hospitalized patients and much has been discussed about its consequences.[4] The nutritional status of hospitalized patients influences morbidity and mortality and its clinical evolution. It is possible to identify nutritional problems, to minimize certain complications and to improve the utilization of the nutritional offer through the monitoring of the ENT practice.[5]

In this context, the present study aims to evaluate the prescribed volume of enteral diet versus infused volume, identifying the causes of interruption of enteral diet infusion and the costs generated by these interruptions.

METHODS

It is an observational study, conducted with adult and elderly patients, with enteral nutrition prescription as the only food source, administered by infusion pump, users of a private hospital in the center of São Paulo.

The work was approved by the Research Ethics Committee of the Adventist University Center of São Paulo, under protocol No 43859415.5.0000.5377 on April 17th 2015 and by the clinical director of the Hospital. Only the patients who were able to express their consent participated in the research and in case of non-cognitive ability, the consent was made by the legal guardian.

Data collection was performed between June and July 2015. They were collected through an electronic medical record. Data were collected regarding the characterization of the studied population as sex, age and medical diagnosis. The type of diet prescribed, intercurrences, calculation of the cost of diet administration, volume of prescribed enteral diet and infused volume also parameters collected.

The enteral formulas used were of the industrialized type, and they follow the medical prescription. The dosage form is infusion pump continuous. To determine the cost of administering the diet per patient, the values of the diets, the specific equipment, the bottles used, and the workforce of nurses and nursing technicians were analyzed, with values provided by the administrative department of the hospital.

The data was organized in the Microsoft Office Excel worksheet. The sample was divided into two age groups, 50-80 years and 81-100 years. The normality of the data was evaluated by means of the Kolmogorov-Smirnov test, are presented in mean and 95% confidence interval and to evaluate the difference between the prescribed and infused volumes, the paired t-test was used and the comparison between the two Groups was performed using the Wilcoxon test. E was considered significant when $p < 0.05$.

RESULTS

Twenty-seven patients were evaluated, being 19 females and 8 males, with a mean age of 79.7 ± 13.2 years (Table 1).

Table 1 - Characterization of the studied population. São Paulo, 2015

Variables	n (27)	%
Gender		
Female	19	70
Male	8	30
Age Group		
50-80	13	48
81-100	14	52
Medical diagnostic		
Pneumonia	8	30
Urinary tract infection	3	11
Sepsis	3	11
Peptic ulcer	1	4
Diarrhea	1	4
Laryngeal neoplasm	1	4
Femur fracture	2	7
Stroke	3	11
Coma	1	4
Alzheimers	2	7
Other	2	7

In the 50-80 age group, the volume infused was significantly lower than the prescribed volume, during the five days of follow-up (Table 2), the same was observed in relation to the 81-100 age group (Table 3).

Table 2 - Average of prescribed volume versus the average of volume infused with a confidence interval of 95% (ANOVA) in the age group of 50-80 years

PERIOD	Prescribed Volume (ml) 50-80 (n=13) Average	Infused Volume (ml) 50-80 (n=13) Average	p
DAY 1	741,5 (694,6-788,5)	498,6 (315,1-682,1)	0,0076
DAY 2	741,5 (694,6-788,5)	587,3 434,6-740,1	0,0295
DAY 3	923,1 (755,5-1091,0)	472,5 (286,6-658,4)	0,0002
DAY 4	846,2 (619,2-1073,0)	401,2 (205,3-597,2)	0,0004
DAY 5	769,2 (504,2-1034,0)	351,5 (120,7-582,2)	0,0028

Table 3 - Average of prescribed volume versus the average of volume infused with a confidence interval of 95% (ANOVA) in the age group of 81-100 years

PERIOD	Prescribed Volume (ml) 81-100 (n=14) Average	Infused Volume (ml) 81-100 (n=14) Average	p
DAY 1	720,0 (720,0-720,0)	309,4 (168,2-450,5)	<0,0001
DAY 2	802,1 (727,0-877,3)	546,8 (347,6-745,9)	0,0021
DAY 3	857,1 (647,5-1067,0)	595,6 (383,5-807,8)	0,049
DAY 4	642,9 (355,8-930,0)	299,0 (67,7-530,3)	0,0093
DAY 5	642,9 (355,8-930,0)	256,9 (60,1-453,6)	0,0036

There were no significant differences between the prescribed volume and volume infused between the age groups (Table 4).

Table 4 - Average of prescribed volume versus the average of volume infused with a confidence interval of 95% (ANOVA) between age groups

Prescribed Volume (ml) (51-80 years old)	Prescribed Volume (ml) (81-100 years old)	p
804,3 (732,4-876,2)	743,2 (658,0-828,5)	0,26
Infused Volume (ml) (51-80 years old)	**Infused Volume (ml) (81-100 years old)**	**p**
462,2 (383,6-540,9)	417,0 (327,0-507,1)	0,40

The cost of administering the diet resulted in R$ 37,690.11 spent on the 27 patients in one day. It is observed that only 58.63% of these expenses were actually used by the patients and 41.37% were discarded (Frame 1).

Frame 1 - Approach for the administration of enteral diets of patients studied in the one-day period, including labor (Nurse and Nursing Technician)

PATIENT	Cost of administration of the diet (R$) per 1000 ml	Cost (R$) of total infused volume (ml)	Cost (R$) of total discontinued volume (ml)
Patient 1	1263,78	448,64/355	815,14/665
Patient 2	1004,78	1004,78/1000	0,0/0
Patient 3	1263,78	226,21/179	1037,57/821
Patient 4	1279,78	319,95/250	959,83/750
Patient 5	1263,78	422,10/334	841,68/666
Patient 6	1206,78	301,69/250	905,09/750
Patient 7	1274,78	752,12/590	522,66/410
Patient 8	1206,78	485,12/402	721,66/598
Patient 9	1298,78	1039,02/800	259,76/200
Patient 10	1321,51	792,90/600	528,61/400
Patient 11	2395,46	718,63/300	1676,83/700
Patient 12	1008,09	465,74/462	542,35/538
Patient 13	1263,78	947,83/750	315,95/250
Patient 14	1279,89	1279,89/1000	0,0/0
Patient 15	2395,46	2275,68/950	119,78/50
Patient 16	1087,87	636,40/585	451,47/415
Patient 17	1206,78	579,25/480	627,53/520
Patient 18	2395,46	2395,46/1000	0,0/0
Patient 19	1263,78	1263,78/1000	0,0/0
Patient 20	1206,78	844,75/700	362,03/300
Patient 21	1263,78	379,13/300	884,65/700
Patient 22	2395,46	479,09/200	1916,37/800
Patient 23	1263,78	884,64/700	379,14/300
Patient 24	1263,78	1232,18/975	31,60/25
Patient 25	1263,78	269,18/213	984,60/787
Patient 26	1087,87	386,19/355	701,68/623
Patient 27	1263,78	1263,78/1000	0,0/0
TOTAL	37690,11	22094,13	15595,98

The number of intercurrences was elevated considering the study, mainly in relation to diarrhea (Table 5), usually associated with contamination, but in this case the diets are presented in a closed system, which makes us think that the volume or time administration or the medication used may be responsible for this.

Table 5 - Distribution of intercurrences in the administration of enteral diets

INTERCURRENCES	n	%
Diarrhea	8	40
Infusion bomb	3	15
Reflux	2	10
Emesis	2	10
Hemodialysis	2	10
Nursing procedures	3	15
TOTAL	20	100

DISCUSSION

In the present study, female prevalence was observed among the patients studied. Rabelo et al., Studying the representativeness of hospital admissions in a general hospital in Rio de Janeiro, verified the prevalence of males in relation to females, with 72.6% and 27.3%, respectively.[6] A descriptive study, conducted by Santos (2008), in Guaramiranga/CE, it was possible to characterize hospitalizations and hospital deaths in 2005 within the scope of SUS, among elderly residents in that municipality. The source used was the Hospital Information System (SIH). It was observed that the population of the elderly corresponded to 9.4% of the general population, and was responsible for 19.2% of hospitalizations, with the hospitalization/population ratio twice as high for the elderly, in relation to the group of adults with age group between 20 and 59 years, gradually increasing with the advancement of age. Males presented higher hospitalization rates than females, except for behavioral disorders in the group of 80 years and over.[7]

In a study developed by Morosini et al. (2011), with elderly hospitalized in Recife from 1998 to 2005, observed that the time and the average cost of hospital stay decreased with increasing age. Of the total spent, 70.6% were for diseases of the circulatory system, mental disorders, diseases of the respiratory system, diseases of the digestive system and neoplasias.[8]

According to Lima and Bueno (2009), Brazil is presenting as a population characteristic the feminization of old age, with an increase in life expectancy, surpassing the age of 70 years, with a higher incidence of chronic diseases, raising concerns at all stages of the health care.[9]

It is observed in the present study that the elderly hospitalized presented higher ages, being most above the average of 79 years, demonstrating that the older the population, the greater the number of hospitalizations. On the other hand, Silveira et al. (2013) reported that the greatest number of hospitalizations were found in the adult age group, although the proportion of expenditures was higher with the elderly, mainly with mental and behavioral diseases, osteomolecular and connective tissue, followed by diseases of the circulatory system and external causes.[10]

Research shows that in Brazil, hospitalized elderly persons present higher costs and more clinical complications, as well as higher mortality rates and functional and cognitive impairment, aggravating social problems at the time of discharge and increasing risks for the development of the fragility syndrome. The frequency of hospitalization is also greater. About 2/3 of the general hospital beds are occupied by the elderly, equal to or above 65 years, and those over 75 years of age have a longer stay. For the Brazilian elderly population, 70% of hospitalization indications are for the treatment of an acute condition or the exacerbation of a chronic condition, followed by 15% for diagnostic evaluation, 10% for palliative care and 5% for elective surgical procedures.[11]

Studies report that advanced age, and concomitant with the change in health status, require greater attention from professionals in order to prevent, maintain and control the possible complications related to ENT.[12]

A study carried out with elderly individuals by Nunes (2012), in Santa Maria, describes that respiratory, circulatory and Alzheimer diseases are public health problems that demand attention from all management bodies including the multidisciplinary health team.[13]

In a study carried out in a University Hospital in Montes Claros/Minas Gerais, with hospitalized individuals mostly female, it was verified that respiratory and circulatory diseases are the main causes of morbidity for the group of elderly people over 60 years of age. These diseases are almost always chronic conditions, the proper management of which is often neglected by health professionals and caregivers, including the patients themselves. The current process of aging of the population should therefore highlight the need for greater attention to these diseases.[6]

Similar to what has been reported previously, the main morbidities presented by the patients of this study were respiratory diseases and infections, followed by circulatory diseases, and as observed by Martins, Alves and Torres (2012),[14] pneumonia was the most frequent morbidity in the study population.

Studies indicate that Chronic Obstructive Pulmonary Disease (COPD) morbidity increases with age and is higher among men than among women. This disease has become one of the main causes of demand for medical care, in ambulatory, hospital or emergency service. It is the fourth leading cause of death in the world and projections indicate an increase in this prevalence in the coming decades, especially among the elderly.[15]

Natural physiological changes and modifications of aging, such as reduction of cardiac output, lung capacity and renal function, should be considered in order to determine the formulation and appropriate amounts of macro, micronutrients and liquids of ENT. Many chronic diseases have their highest prevalence in this higher age group.[11] There are several physiological changes that interfere with nutritional status, as shown by Borrego and Catarina (2013). These include decreased basal metabolism, redistribution of body mass, altered digestive functioning, altered sensory perception and decreased thirst sensitivity. These last three can directly interfere in the food consumption, leading to the low dietary intake.[16]

Even with the increase in life expectancy, the elderly still represent a fragile population, with the morphological, biomolecular and functional alterations that affect the organism.

Among the acute conditions, the infections of urinary and pulmonary focus are the main ones, responsible for about 55% of these hospitalizations. Hypoactive delirium, levels of lowering of consciousness, are responsible for 19% of hospitalizations.[11]

In this study, it is observed that the main intercurrence for interrupting the diet is diarrhea, which may have contributed to the low infused volume of diet among patients. It is necessary to identify the etiology of diarrhea to take the first step in the treatment of diarrhea.[17]

A study conducted by Campos (2013) suggests that the number of times diarrhea occurs should be recorded and analyzed, because the causes are not always related to enteral diet.[18]

Clostridium Difficile (CD) was first described in 1935, and has been singled out as the leading cause of diarrhea in the hospital setting. The cost assigned to him in the United States ranges from $ 2470 to $ 3669 for each episode. The number of CD cases has increased in recent years due to the indiscriminate use of antibiotic therapy, a greater number of immunosuppressed individuals, and a high number of occupied beds, favoring the spread of spores in the hospital environment.[19]

In a study with health professionals in Paraná, developed by Lordani et al. (2014), intensive care nurses interviewed about enteral nutrition practices and opinions believed that the use of antibiotics may be related to diarrhea and reported that in 38.8% of diarrhea episodes they reported the nutritionist.[20]

Borges et al. (2008) assume that patients exposed to ICU pathogens, medications and medical procedures related to prolonged hospitalization also contribute to the development of diarrhea.[21]

Coppini et al. (2011), in Projeto Diretrizes, affirm that fibers, specifically the soluble ones, are related to the prevention and control of the diarrhea, since they are highly fermentable by the anaerobic bacteria, forming more amount of short chain fatty acids (CFA). These are essential for supplying energy to colon cells, regulating bowel functions, promoting the absorption of water and electrolytes (such as sodium), the growth of intestinal pathogenic bacteria is minimized and consequently contributes to the improvement of diarrhea.[22]

It is also possible that situations related to enteral nutrition, such as strict hygiene, continuous infusion mode (in infusion pump) and the use of low osmolar enteral formulations, with non absorbable fibers, contribute to the reduction of the occurrence of diarrhea in this scenario.[22]

Through a study, Silva (2010) observed that it is of great importance that nutritional assistance be provided with quality and for this to happen, quality management in nutritional therapy depends on the implementation of elaboration and standardization of the manipulation guides elaboration of control of records, such as preventive and corrective actions; Follow-up of adverse incidents in addition to review and adjustment of the processes and objectives of the Service. The adoption of a quality management policy in nutritional therapy by the institutions, translated through the presence of the Multiprofessional Nutrition Therapy Team (MNTT), working in health services, making them more effective, efficient and optimized.[23] It can generate savings due to actions and can be reinvested in hiring health professionals in deficit areas, staff training, upgrading and modernization of services infrastructure and others that lead to excellence in care delivery. The benefits will extend to patients, health institutions, professionals themselves and society as a whole.

It is of great importance to monitor the enteral diet and there is a need to be individualized and guided widely, and all data from this monitoring should be recorded in a specific form and attached to the patient's chart. The routine monitoring of the ENT instrumentalizes with the MNTT, favors an analysis of the trend, indicates the processes to be reviewed and facilitates the development of strategies for realigning the conduits, developing practices agreed with the most recent guidelines.[24]

When conducting the monitoring of enteral diet it is possible to identify problems that interfere in the nutrition of inpatients and the improvement in the practice of diet administration may be more appropriate to the treatment and to minimize clinical complications. Often the administration of enteral diet may represent improvement and/or recovery of general health status.[5]

Studies show that there are a number of variables that contribute to the costs of nutrition, in the UK being £7 per day, and in the United States, $46 per day. In addition, most studies are of poor quality, which makes it difficult to analyze the data more closely and reliably.[3]

One of the advantages of the enteral diet is the maintenance of the function and structure of the intestinal mucosa and reduction of infectious complications. It can reduce the length of hospital stay and costs.[25] Matsuba et al. (2011), in Projeto Diretrizes, recommend that to guarantee the quality of enteral formulations, it should be observed: formulation, volume, color and appearance check, density, preparation date, validity, packaging and preservation. Also including monitoring of patient related aspects, such as identification of the bottle with name and bed, type of diet, route, time and administration time, position of the probe. Periodic monitoring and review of the routine should be administered in order to detect critical points to promote patient/patient safety and greater effectiveness of the procedure.[17]

A study presents the application of an enteral nutrition protocol that informs the steps in initiating nutrition, as an example: the nurse administered the diet at 25 ml/h, evaluating the volume of gastric residue, increased the volume of the diet every 4 hours, or asked the doctor to prescribe prokinetic agents. He also controlled the volume and calories administered, compensating for the pauses. In the application of this protocol, the patients received higher caloric ($p = 0.015$) and protein ($p = 0.002$) in the first seven days of NE use, compared to those who did not use the standard protocol.[26]

A study by Cervo et al. (2014), conducted at a University Hospital of Santa Maria in Rio Grande do Sul, Brazil, with adults above 18 years of age, with a prevalence of 41 to 80 years of age and male sex, found that the mean infusional volume of the enteral diet was lower than the estimated volume, during the hospitalization period. In the present study, it was found that the volume infused was significantly lower than that prescribed in the whole sample during the observation period.[12]

The demands of nutritional therapy, quality control and monitoring of administration to patients during the hospitalization period are challenging and of high priority. The products should contain clear information on composition, origin, manipulation, enteral access, such as nasal tubes or ostomies, in the routine administration. It is recommended that the protocols be detailed in order to reduce complications and improve nutritional outcomes.[27]

The present study served to implement new protocols in the hospital studied, aiming to minimize the wastage observed throughout the diet administration process

(41.4%), providing an improvement in the quality of nutritional assistance.

The training of employees must be intensified in conjunction with the implementation of protocols, so that through possible quality indicators, failures can be minimized and even extinguished from the care service of the hospital in question. Very challenging is the nutritional support of the patient in the use of ENT, and malnutrition is a factor that cannot be emphasized, since the nutritionist has the priority of making nutritional support more safe and efficient. Early precocity of nutritional support and adequate supply of nutrients may reduce morbidity and mortality or minimize adverse events in relation to ENT. Once the problems are identified, it is imperative to implement measures and actions to avoid wasting resources. Integrated work with interdisciplinary teams is of extreme importance for the development of processes aiming at efficiency and problem solving, which improves productivity.[28]

CONCLUSION

In the sample studied, the volume of infused enteral diet was lower than that prescribed and there was no difference between the age groups. The main reason for discontinuation of dieting was diarrhea, with a multifactorial etiology. The amount wasted at this private hospital for uninfused diets was raised by almost half of the costs spent on diet management.

This study contributes to the performance and performance of the nutritionist in conjunction with the MNTT in the integrated work aiming at the improvement in the administration of ENT, since it is fundamental for the patient with nutritional risk, minimizing depletion and adverse events in nutritional assistance.

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Received on: 05/04/2016
Reviews required: 25/05/2016
Approved on: 19/09/2016
Published on: 10/07/2017

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